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(54) Title of the Invention: Tactile Sensation Game Machine

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## Problems the Invention Is to Solve

realistic tactile sensation vibration.

of the tactile sensation member when changing the control mode, thus generating a more motors to a tactile sensation member and suitably switching the vibration characteristics vibration. For example, an improvement that has been considered is linking a plurality of Therefore various means have been proposed to provide change to mechanical

feeling of speed determine its appeal as a game machine.

characteristics of the tactile sensation vibration that impact a feeling of gravity and a battle games and so forth that incorporate combat scenes, it is sometimes the case that the are continuing to spread in the field of everyday toys. In this case, particularly in space on a desktop that enable one to enjoy a game overruling with the feeling of being there size motors or hydraulic devices. Meanwhile, tactile sensation game machines [played] almost as big as the real thing and provide tactile vibration by means of large- have implemented devices that incorporate large-size screens into cockpits that are being there corresponds to the screen. Therefore so-called game centers and the like when controlling/operating or shooting is an important factor in providing a feeling of via a control lever, handle, steering wheel, etc. (hereinafter, "tactile sensation member")

In this type of tactile sensation game machine, a mechanical vibration transmitted recent years it has become popular as a game machine enjoyed by young and old. enables one to enjoy control techniques and the sensation of shooting and so forth, so in changing screen that simulates high-speed driving or space battles, for example, and

A tactile sensation game machine performs predetermined control in response to a

## Prior Art

possible to enjoy the sensation of controlling them.

The present invention pertains to a tactile sensation game machine that simulates controlling and operating a spacecraft fighter or automobile or the like and makes it

## Industrial Field of Utilization

## 3. DETAILED DESCRIPTION OF THE INVENTION

fitting and when hitting.

amplitude of the tactile sensation lever is changed by an amplitude variation means when oscillate along the mounting cylinder's outside spherical surface, and the vibration member linked to said switch are respectively provided at a control body that can correspondingly to said target image screen and a tactile sensation lever having a trigger surface and they can oscillate vertically and laterally respectively, a pursuit scope cylinder and a hit switch for generating vibration when hits occur is provided at the rear of the front surface of a base mounted inside an outside spherical surface's mounting A tactile sensation game machine, wherein a target image screen is provided at

## 2. CLAIMS

Tactile Sensation Game Machine

## 1. TITLE OF INVENTION

SPECIFICATION

a rotary disk made of transparent plastic; printed thereon are images corresponding to the oscillation mechanism 6 therebetween respectively. The target image screen 4 consists of the front end of the member 31 and a hit switch 5 is provided in the back end with an

mounting inside the aforesaid mounting cylinder 2; a target image screen 4 is provided in item 3 is a base. The base 3 is provided with a bracket-shaped frame body 31

back. Its two ends are mounted on the aforesaid stand 1's support columns 1a.

Item 2 is a mounting cylinder; the mounting cylinder 2 consists of a shell body

application's game machine to be stably supported on a desktop.

1a are provided at both sides. The stand 1 permits the main body 100 of this chamber and sound-generating circuits, etc. (not shown in the drawing); support columns in the drawings, 1 is a stand. The stand 1 houses a battery accommodation

in the cam's amplitude variation principle.

FIG. 8(a) and (b) are drawings explaining the structure of the amplitude variation means. FIG. 7 is an oblique view showing the vibration switch's pressing means and the base. FIG. 6 is a sectional view showing the relationship between the tactile sensation body. FIG. 5 is a sectional view showing the relationship between the base and pursuit means. FIG. 4 is an oblique view showing the structure of the tactile sensation vibration switch's pressing oblique view showing the structure of the base and oscillation mechanism. FIG. 3 is an oblique view showing the structure of the base and oscillation mechanism. FIG. 2 is an oblique view of the entire application's tactile sensation in the attached drawings.

Below, the present invention shall be explained based on the embodiment shown in the attached drawings.

### Embodiment

and it is possible to implement a tactile sensation game machine that is small and simple. tactile sensation vibration means can be generated with a single vibration generating means, changed by an amplitude variation means when firing and when hitting. A plurality of outside spherical surface; and the vibration amplitude of the tactile sensation lever is respectively provided at a control body that can oscillate along the mounting cylinder's tactile sensation lever having a trigger member linked to the aforesaid switch are respectively; a pursuit scope corresponding to the aforesaid target image screen and a occur is provided at the rear surface and they can oscillate vertically and laterally spherical surface's mounting cylinder and a hit switch for generating vibration when this a target image screen is provided at the front surface of a base mounted inside an outside a target image screen is provided to achieve the aforesaid object, the present invention is constituted so that

### Means for Solving the Problems

The present invention considered these points. Its object is to provide a tactile sensation game machine provided with a vibration generating means that can generate various vibration modes with a simple mechanism.

Nevertheless, the aforesaid conventional tactile sensation game machine requires individual mechanisms consisting of motors and vibration generating members linked to the motors for each type of tactile sensation vibration mode, so the device may become large, complicated, and expensive.

The lateral oscillation of the first oscillation arm 61 and the vertical oscillation of the second oscillation arm 63 are combined in this manner, so that it oscillates irregularly in both vertical and lateral directions.

Item 63 is a second oscillation arm, the second oscillation arm 63 also consists of a nearly bracket-shaped frame body, and is pivotally supported by a shaft  $J_2$  at a center piece 61 of the aforementioned first oscillation arm 61 so that it can oscillate. The second oscillation arm 63 is respecitively provided with the aforementioned target image screen 4 at its front end and the aforesaid hit switch 5 at its back end, with a pin  $P_1$  and long hole  $N_2$  interposed, and a pin  $P_2$  parallel to the aforesaid shaft  $J_2$  at the side of the center piece 61. The pin  $P_2$  is for driving the second oscillation arm 63, so it is fitted into an inclined cam 65 that is capable of forming a complicated oscillation pattern. Here, the irregular cam 65 is pivotally supported and integrated with a gear  $G_1$ , it is driven via a gear curved cam 65 is pivotally supported and integrated with a gear  $G_2$ , which is integrated with the aforesaid eccentric rotary disk 62 and meshes with the eccentric rotary disk 62 and gear  $G_2$ , as a result of which the cam follower 64 oscillates irregularly, and furthermore the pin  $P_2$  is driven forward and in reverse (relative to the base 3) via the cam follower 64's indentation 64a. Therefore the second oscillation arm base 3) oscillates irregularly in a vertical direction relative to the base 3 centred on the shaft 63.

The actoresaid oscillation mechanism 6 is provided with two oscillation arms and two drive cams, it is constituted so that it can oscillate the actoresaid target image screen 4 and hit switch 5. That is, in FIG. 3, 61 is a first oscillation arm; the first oscillation arm 61 consists of a nearly bracket-shaped frame body whose upper piece 61a is longer than the lower piece 61b, and is disposed in a nested manner with the actoresaid bracket-shaped frame body's base 3 and pivotally supported by shafts  $J_1$  and  $J_2$  so that it can oscillate. The oscillation arm 61's upper piece 61a is provided with a long hole  $N_1$  in the front part; an eccentric rotary disk 62 is fitted into the long hole  $N_1$ . Also, the first oscillation arm 61 is constituted so that it can oscillate laterally in response to the rotation of the eccentric rotary disk 62.

The aforesaid hit switch 5 is for generating the sound and vibration when there is a hit, so it consists of a plate-like member 51 provided at the back end of the aforesaid second oscillation arm 63 with the pin P<sub>1</sub> and long hole N<sub>2</sub> interposed. A pressuring part 5a is provided at its back end and a reflecting member 5b is provided at its front end. The switch 5 oscillates irregularly and laterally due to the combined oscillation of the first oscillation arm 61 and second oscillation arm 63 as described earlier, so it is constituted so that it is operable only when a pressuring member 9f to be described later is set on the same line. Then, when pressuring occurs, a sound and vibration generating circuit (not shown in the drawing) is connected to a predetermined mode, the aforesaid reflecting mirror 5b is brought near the light-emitting lamp L, and the backlight of the target image screen 4 rapidly becomes bright. Item B is a spring that tensions the member 51 in the projecting direction.

Item 7 is a control body 7 is provided with a guide part 7a along the outer spherical surface of the aforesaid mounting cylinder 2, and consists of a shell body 71 covering the outside of the mounting cylinder 2. Oscillation (in polar coordinates) is possible in any direction relative to the mounting cylinder 2 via this guide part 7a (FIG. 4, FIG. 5, FIG. 6). Also, the control body 7's shell body 71 is provided with a pursuit scope 8 corresponding to the aforesaid target image screen 4 and with a pursuit scope 8 corresponding to the aforesaid tactile sensation lever 10. They are constituted so that the tactile sensation lever 10 that has a trigger member 9 that can be linked to the aforesaid switch 5 and with a vibration generating part 11. They are constituted so that the tactile sensation lever 10 changes when hitting and when hitting.

The aforesaid pursuit scope 8 is positioned at the front surface of the game machine main body, and consists of a window-shaped semi-transparent plate incised with an aiming mark M<sub>2</sub> in its center. It is constituted so that it freely oscillates integrally with the aforesaid control body 7 and the aforesaid tactile sensation switch 5 match on the same line.

The aforesaid trigger member 9 sequentially links the pressuring operation of a image screen 4's target image M<sub>1</sub> when the aforesaid trigger member 9 at the rear surface of the control body 7 and the aforesaid tactile sensation switch 5 match on the same line. The aforesaid button 9a provided at the front of the aforesaid tactile sensation lever 10, and the button 9a pressing part 5a is pressed by a pressuring member 9f at the rear is, when the hitting button 9a is pressed at the front of the tactile sensation lever 10, and the aforesaid switch 5's pressing part 5a is provided at the rear of the tactile sensation lever 10. That is, at the right side so that it can freely extend and sink, is pressed, 10 at the interior, to the interior,

(1) A curved member 9b passing through the inside of the lever 10 is pressed to the interior,

(2) Because of this, a pin P<sub>3</sub> projectingly provided at its end causes an oscillating piece 9c to rotate relative to a shaft J<sub>3</sub>,

(3) Because of this, the oscillating piece 9c's pin P<sub>4</sub> moves a plate-shaped member 9d toward the rear of the game machine,

(4) Because of this, the plate-shaped member 9d causes a moveable plate 9e to oscillate relative to a shaft J<sub>4</sub>,

(4) [sic] Because of this, the pressuring member 9f is moved to the front (toward the front of the game machine),

and the aforesaid pressuring part 5a is pressed.

The aforesaid tactile sensation levers 10 and 10 are grip members for transmitting sound and vibration when a missile is launched and sound and vibration when there is a hit to the user of the game machine. They resemble the control lever of a lighter and are provided at both sides of the game machine. They resemble the control lever of a lighter and are 10 and 10 consist of grip parts 10a and 10a projecting at the outside of the outer shell 10, while fitted into long holes N<sub>3</sub> and N<sub>3</sub> provided at their ends is an amplitude variator cam 12 (amplitude variator means) of the aforesaid vibration generating part 11 provided inside the outer shell body of the main body 100; it can oscillate in response to the rotation of the amplitude variator cam 12 centered on the shaft J<sub>3</sub>. Here the vibration generating part 11 is provided with an angular tube body 11a having a drive variator cam 12 and a driven variator cam 12 centered on the shaft J<sub>3</sub>. Here the motor (not shown in the drawing) inside, it is provided in the center of the control body 7 along the direction toward the inside of the aforesaid mounting cylinder 2.

Here, the amplitude variable piece 13 is provided with a standing drive pin P<sub>5</sub> that is linked to a motor in the aforesaid vibration generating part 11. It is a long tube body 11a at an eccentric location equivalent to the fan's "pivot"; it is constituted so that it can be rotated forward or in reverse by the motor (in the drawing, forward is direction a and reverse is direction b). In contrast to this, the driven rotary body 14 has a long hole N<sub>4</sub> to ensure a different eccentricity at each end; the drive pin P<sub>3</sub> [sic] of the drive piece 13 passes through it. The driven rotary body 14 is also provided with a bracket-shaped receiving member U that can lock with the front part of the rotation direction regardless of whether the drive piece 13 rotates forward or in reverse. Here, the long hole N<sub>4</sub> and the receiving member U are eccentrically provided relative to the center of the driven rotary body 14. Therefore they are constituted so that when rotating forward (direction a) the receiving member U is eccentrically provided relative to the center of the driven rotary body 14 and when rotating in reverse (direction b) the center of the drive piece pin 13's pin P<sub>3</sub> is eccentrically eccentricity S<sub>1</sub> [sic] and when rotating in reverse (direction b) the center of the drive piece pin 13's pin P<sub>3</sub> is eccentrically eccentricity S<sub>2</sub> [sic].

Item 21 is a shoot-down counter. The counter 21 is provided at the front surface of the game machine main body 100 near the aforesaid vibration generating part 11; it is constituted so that it is linked to the motor inside the vibration generating part 11 via a catch 20. The counter can rotate via the catch 20 only when the motor runs in reverse; catch 20, it can rotate only by a fixed angle. That is, it is constituted so that it operates moreover, it can rotate only by a fixed angle. Each time this application's game machine switches hit modes, the number of hits is increased one by one, and displayed on the front surface of the main body 100.

Furthermore, this embodiment is constituted so that the small vibration when rotating forward inhibits the firing vibration when firing a missile and the large vibration of the game machine main body 100 when a missile is launched and sound and vibration when there is a hit to the user of the game machine. The counter 21 is a shoot-down counter. The counter 21 is provided at the front surface of the game machine main body 100 and 10 are grip members for transmitting sound and vibration when there is a hit to the user of the game machine. They resemble the control lever of a lighter and are provided at both sides of the game machine. They resemble the control lever of a lighter and are 10 and 10 consist of grip parts 10a and 10a projecting at the outside of the outer shell 10, while fitted into long holes N<sub>3</sub> and N<sub>3</sub> provided at their ends is an amplitude variator cam 12 (amplitude variator means) of the aforesaid vibration generating part 11 provided inside the outer shell body of the main body 100; it can oscillate in response to the rotation of the amplitude variator cam 12 centered on the shaft J<sub>3</sub>. Here the motor (not shown in the drawing) inside, it is provided in the center of the control body 7 along the direction toward the inside of the aforesaid mounting cylinder 2.

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cam, so the device structure is also simple. Amplitude variation means has a simple structure consisting of an eccentric member and a cam, so the device structure is also simple. And interest in the game machine can be increased. Moreover, the and when hitting—and interest in the game machine can be increased when hitting, tactile sensation vibration can be changed in each mode—when pursuing, changed by an amplitude variation means when firing and when hitting. Therefore the outside spherical surface, and the vibration amplitude of the tactile sensation lever is respectively provided at a control body that can oscillate along the mounting cylinder's and a tactile sensation lever having a trigger member linked to the aforesaid switch are laterally respectively, a pursuit scope corresponding to the aforesaid target image screen when hits occur is provided at the rear surface and they can oscillate vertically and outside spherical surface's mounting cylinder and a hit switch for generating vibration that a target image screen is provided at the front surface of a base mounted inside an that a target image screen, as described above, is characterized as being constituted so

#### Effect of the Invention

number of shoot-downs is incremented one by one. down marker 20 [sic] rotates the counter 21 by exactly the predetermined angle, and the other end of the long hole N<sub>4</sub>. In addition, each time reverse rotation begins, the shoot-transmitted to the tactile sensation levers 10 and 10 via the drive pin P<sub>4</sub>, positioned at the rotary body 14 rotates with eccentricity S<sub>2</sub>, and a large-amplitude [vibration] is created. Then the motor in the vibration generating part 11 rotates in reverse, the driven image T and target image 4 rapidly brighten; an explosion sound is simultaneous and the reflecting mirror S<sub>0</sub> moves near the light-emitting lamp L, and the background successfully match, the member 51 moves toward the front and switches on in hit mode, successive On the other hand, if the centerlines of the member 9 and the member 5 a

10 and 10. a small-amplitude vibration of eccentricity S<sub>1</sub> is transmitted to the tactile sensation levers via drive pin P<sub>4</sub>, positioned at one end of the long hole N<sub>4</sub> by the receiving member U, and rotates forward, and the fan-shaped rotary member 13 rotates the driven rotary body 14 matches, the missile launch sound is created and the vibration generating part 11's motor When this happens, if the centerlines of the member 9 and the member 5 a do not

via members 9b, 9c, 9d, and 9e. with the right thumb, the member 9f is pressed toward the switch 5's pressing member 5a mark M<sub>1</sub> and mark M<sub>2</sub> match, if the firing button 9a of the trigger member 9 is pressed the pursuit scope 8 and the target mark M<sub>2</sub> on the target image 4 match. Then, when the hands, and appropriately oscillates the pursuit body 7 [sic] so that the aiming mark M<sub>1</sub> on a constant speed. Now the player grasps the tactile sensation levers 10 and 10 with both irregularly vertically and laterally in front of the background image T, which is rotating at generated, and the oscillation means 6 makes the target image screen 4 oscillate see. When a power switch 15 is turned on, BG sounds suitable for a space game are scope 8 is positioned so that it is directly before the player and at an angle that is easy to In the aforesaid embodiment, when the stand 1 is set on a desktop, the pursuit

be suitably modified according to the contents of the game. simultaneously created, but of course the characteristics of this vibration and sound can when rotating in reverse imitates the shock vibration of a hit, and an imitation sound is

1	Stand
2	Mounting cylinder
3	Base
4	Target image screen
5	Hit switch
5a	Pressing part
5b	Reflecting mirror
6	Oscillation mechanism
7	Control body
8	Pursuit scope
9	Trigger member
10	Tactile sensation lever
11	Oscillation generating means
11a	Angular tube body
12	Amplitude variation cam (vibration variation means)
13	Fan-shaped movable piece
14	Driven rotary body
15	Power switch
20	Catch
21	Counter
31	Frame body
61	First oscillation arm
62	Eccentric rotary disk

FIG. 1 is an oblique view of the entirety of this application's tactile sensation means. FIG. 2 is an oblique view with a partial cut-out of the same. FIG. 3 is an oblique view showing the structure of the base and oscillation mechanism. FIG. 4 is an oblique view showing the tactile sensation vibration switch's pressing game machine. FIG. 5 is a sectional view showing the relationship between the base and pursuit means. FIG. 6 is a sectional view showing the relationship between the tactile sensation body. FIG. 6 is a sectional view showing the relationship between the tactile sensation switch's pressing means and the base. FIG. 7 is an oblique view showing the vibration switch's generating means. FIG. 8(a) and (b) are drawings explaining the structure of the amplitude variation cam. FIGS. 8(a) and (b) are drawings explaining the cam's amplitude variation principle.

#### 4. BRIEF DESCRIPTION OF THE DRAWINGS

As a result, [the present invention] has an excellent effect in making it possible to provide a tactile sensation game machine that provides varied and realistic tactile sensation modes while keeping a simple and inexpensive device structure.

Agent:

Yukihiko Hamura, Patent Attorney [seal]

T Transparent disk

B Spring

G<sub>1</sub>, G<sub>2</sub> Gear

U Receiving member

M<sup>2</sup> Aiming markM<sup>1</sup> Target imageS<sub>1</sub>, S<sub>2</sub> EccentricityJ<sub>1</sub>, J<sub>2</sub>, J<sub>3</sub>, J<sub>4</sub> ShaftN<sub>1</sub>, N<sub>2</sub>, N<sub>3</sub>, N<sub>4</sub> Long holeP<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub> Pin

L Light-emitting lamp

71 Shell body

65 Irregularly curved cam

64 Cam follower



63

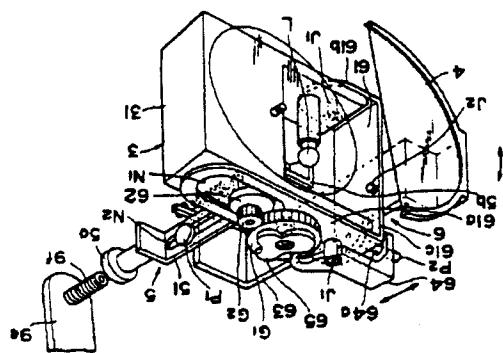


Figure 3

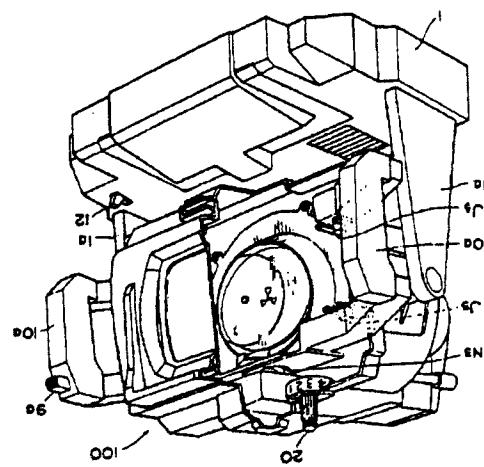
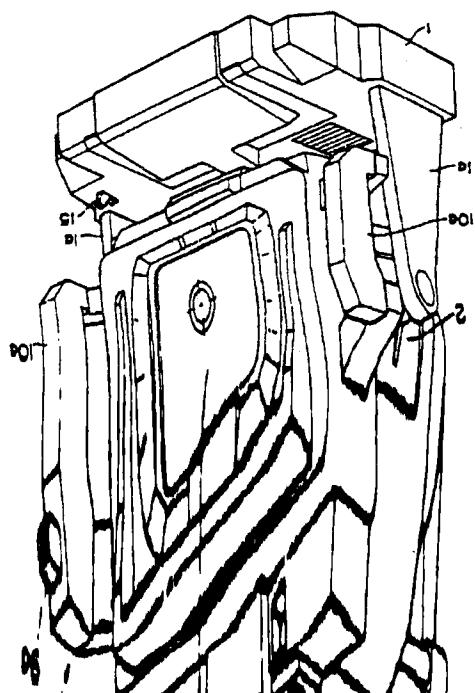


Figure 2



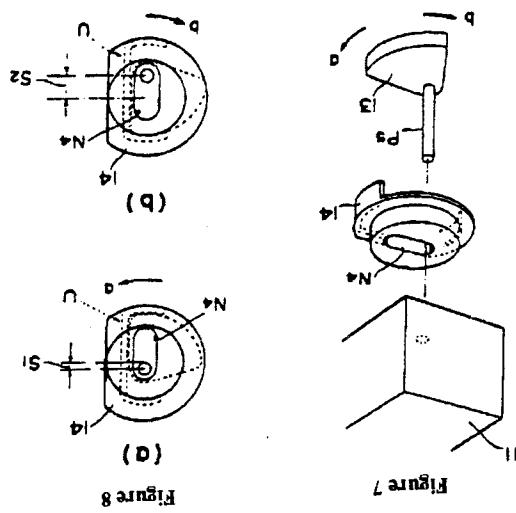


Figure 8

